Safeguarding Communication Satellite

†1457. SHRIMATI SUSHMA SWARAJ: Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether it is a fact that solar activities undergo changes after every eleven years as a result of solar cycle;

(b) whether communication satellite and electrical systems may be disrupted due to this change; and

(c) if so, the measures being taken by Government to safeguard them?

THE MINISTER OF SCIENCE AND TECHNOLOGY (SHRI KAPIL SIBAL): (a) to (c) The information is being collected and will be laid on the Table of the House.

Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

1458. SHRI RAJKUMAR DHOOT: Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether it is a fact that Jawaharlal Lal Nehru Centre for Advanced Scientific Research, Bangalore has been carrying out research relating to generation of new knowledge and possible application in the areas of material sciences and biology;

(b) if so, the work done by the Centre during the last two years; and

(c) the target of work fixed for the year 2007-08?

THE MINISTER OF SCIENCE AND TECHNOLOGY (SHRI KAPIL SIBAL): (a) Yes, Sir. It is a fact that the JNCAR has been involved in the generation of new knowledge and possible application in the areas of Materials Sciences and Biology.

(b) and (c) the Centre has a very strong emphasis on the research on Materials. The Chemistry and Physics of Materials Unit has made vital contributions in the area of materials chemistry and physics. The current research activities in the area of Materials Science include Chemistry and

†Original notice of the question was received in Hindi.

Physics of Materials, Nanomaterials, Organic Electronics & Optoelectronic device, Optical spectroscopy & modeling, Condensed matter systems & Computational Materials Science and Phase Transformations. The Unit is involved in the study of various facets of this interdisciplinary subject, the primary goal being, the design, structure, properties and phenomena associated with advanced materials both inorganic and organic. The unit has acquired and developed sophisticated experimental facilities and also employs state of the art methodology to synthesis and study interesting properties and phenomena in noval materials. In the recent past, the Unit has focused its attention on Nano- Sciences and Technologies.

In the last two years, the facility of Chemistry and Physics of Materials Unit have published more than 150 research papers in reputed international journals with high impact factor. In the next few years, greater attention will be paid to the following areas:

1. Multifunctional materials such as beferroirs
2. Atomic layer by layer synthesis of materials
3. Synthesis, characterization and applications of nanomaterials
4. Plastic electronics
5. Bio-inspired materials
6. Inorganic-organic hybrid materials
7. Computer simulation and modeling of systems and phenomena of Academic interest as well as practical utility.

The Biology Division at the Centre include Molecular Biology and Genetics Unit and Evolutionary and Organismal Biology Unit.

Research in the Molecular Biology and Genetics Unit (MBGU) is in diverse areas of biology bound by the common thread of biomedical applications. The current research areas fall into the categories of Infectious Diseases, Chromatic Organization and transcription Regulation, Developmental Biology and Genetics. The pathogenic agents for AIDS and Malaria, two infectious diseases of great significance to India, are being investigated in the laboratories. The basic mechanisms of chromatin organization and transcription regulation are being studied in the context of mammalian spermiogenesis and cancer. The Centre has recently

identified a genertic locus associated with epilepsy. It is also identifying genes and mutations causing profound deafness and has shown that mutations in Cx26 are a major cause of profound deafness in the Indian population. Using Embryonic Stem Cells, mouse transgenics and Drosophila genetics, new genes required for cardiovascular development has been found.

The Faculty members have published more than 70 research papers in reputed international journals with high Impact Factor in the last two years in the Biology Division.

In the next two years, the MBGU will consolidate the present strength of research work in various areas of biomedical relevance and also further develop some newer programmes in the coming year. Regarding biochemistry of enzymes of the purine salvage pathway, a comprehensive and detailed analysis will be undertaken to enable simulation of metabolic flux through this pathway. The work on HIV will be expanded to cover a few thousand samples of virus strains from all over India to monitor the changing subtype distribution across India. A new research project in the area of nano-biology will be initiated to understand chromatin dynamics in the single molecule level. The role of acetylation and methylation of transition protein TPI and TP2 in chromatin remodeling will be investigated. The chromatin structure of meiotic recombination hotspots will be studied in great detail. The developmental biology of cardiovascular system will be given great impetus to understand the role of *asrij* and *rudhira* in the ES cells pluripotency and differentiation into cardiovascular lineages. Efforts will be made to identify some unique factors that are present exclusively at the Calbicans centromeres that can serve to develop potential targets for antifungal drugs.

The *Evolutionary and organisamal Biology Unit (EOBU)* at the Centre is the principal centre in the country for research and training in the broad areas of Chronobiology, Evolutionary Genetics and Population Ecology. The Unit do mostly epirical researchy, using a combination of experimental tools from evolutionary quantitative genetics, molecular genetics, neurobiology, developmental biology, animal behavior, and population biology. Also conduct theoretical research, largely through computer simulations of mathematical models of biological processes. With over 1000 channels, the Unit's activity recording system for insects and small mammals is the largest such facility in the world.

The Faculty of EOBU have published more than 40 research papers in reputed international journals with high Impact Factor in the last two years.

In the next few years the unit expects to continue its past trend of producing results from ongoing research programmes in chronobiology, evolutionary genetics and population ecology, leading to publication in top journals. In the areas of empirical investigations into the evolutionary genetics of circadian rhythms, the generality of life-history tradeoffs, and metapopulation dynamics, the work being done in the Unit is the first of its kind in the world, and expect to consolidate this position further.

The Centre's faculty have received a number of national and international recognitions for the work done in their areas.

The Centre has also filed about 11 patent applications in the last two years and 4 patents have been granted. Two patents of the Centre have been comercialized and licensed to three industries.

Foreign patents in scientific sectors

†1459. SHRI SURENDRA LATH: Will the Miniter of SICNECE AND TECHNOLOGY be pleased to state:

(a) the scientific sectors in which India achieved the foreign patents during the last five years along with the names of scientists and departments who contributed in this process;

(b) the steps being taken to promote the scientific research in India;

(c) the number of scientific research institutes under Central Government which are working in different fields in the country; and

(d) whether achievements of these scientific institutes are reviewed?

THE MINISTER OF SCIENCE AND TECHNOLOGY (SHRI KAPIL SIBAL): (a) Foreign patents obtained by Indian research institutions and organizations during the last five years are in the broad areas of chemistry, drugs and pharmaceuticals, engineering, biomedical engineering, medical sciences, biotechnology, information technology, material sciences and herbal formulations. These patents have emananted from the institutions of various Centre Government Departments/agencies such as Council of Scientific and Industrial Research (CSIR), Department of Science and

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